

WHAT IS CLAIMED IS:

1. An instrument for detecting the amount of light emitted from the contents of a receptacle vessel, said instrument comprising:

structure defining a transport path along which a plurality of adjacently-arranged receptacle vessels are moved through the instrument;

a photosensitive device disposed along said transport path and constructed and arranged to detect light emitted from the contents of a receptacle vessel operatively positioned with respect to said photosensitive device; and

a receptacle vessel isolating device positioned adjacent said transport path and constructed and arranged to pivot between: (1) a first position permitting the plurality of adjacently-arranged receptacle vessels to be moved along said transport path; and (2) a second position operatively engaging one of said receptacle vessels disposed on said transport path and operatively positioned with respect to said photosensitive device, said receptacle vessel isolating device being constructed and arranged to substantially prevent light from sources other than said operatively positioned receptacle vessel engaged by said receptacle vessel isolating device from being detected by said photosensitive device, said receptacle vessel isolating device being constructed and arranged to pivotally rotate between said first and second positions and including structure at least partially surrounding a receptacle vessel engaged by said receptacle vessel isolating device when said receptacle vessel isolating device is in said second position.

2. The instrument of claim 1, further comprising a transport mechanism constructed and arranged to move the plurality of adjacently-arranged receptacle vessels along said transport path in such a manner as to operatively position each of the adjacently-arranged receptacle vessels with respect to said photosensitive device for a time duration sufficient to permit said photosensitive device to detect the amount of light emitted from the contents of the operatively positioned receptacle vessel.

3. The instrument of claim 1, further comprising one or more sensors constructed and arranged to detect when said receptacle vessel isolating device is in at least one of said first and second positions.

4. The instrument of claim 1, wherein said structure defining a transport path comprises a housing having an inlet for admitting receptacle vessels into said housing and an outlet through which receptacle vessels are ejected from said housing, said transport path extending between said inlet and said outlet.

5. The instrument of claim 4, further comprising:
an inlet door assembly constructed and arranged to move between an open position permitting a receptacle vessel to pass through said inlet and into said housing and a closed position restricting ambient light from entering said housing through said inlet, said inlet door assembly comprising a rotating door mounted so as to be rotatable about a generally horizontal axis of rotation, said rotating door having a solid portion and an open portion, said rotating door being rotated into a position in which said open portion thereof is aligned with said inlet when said inlet door assembly is in said open position, and said rotating door being rotated into a position in which said solid portion thereof is aligned with said inlet when said inlet door assembly is in said closed position; and

an outlet door assembly constructed and arranged to move between an open position permitting a receptacle vessel to pass through said outlet and out of said housing and a closed position restricting ambient light from entering said housing through said outlet, said outlet door assembly comprising a rotating door mounted so as to be rotatable about a generally horizontal axis of rotation, said rotating door having a solid portion and an open portion, said rotating door being rotated into a position in which said open portion thereof is aligned with said outlet when said outlet door assembly is in said open position, and said rotating door being rotated into a position in which said solid portion thereof is aligned with said outlet when said outlet door assembly is in said closed position.

6. The instrument of claim 5, further comprising:

one or more sensors constructed and arranged to detect when said inlet door assembly is in at least a one of said open and closed positions; and

one or more sensors constructed and arranged to detect when said outlet door assembly is in at least a one of said open and closed positions.

7. The instrument of claim 5, wherein said inlet door assembly further comprises:

a motor operatively coupled to said rotating door of said inlet door assembly for effecting powered rotation of said rotating door between positions corresponding to said open and closed positions of said inlet door assembly; and

a motor operatively coupled to said rotating door of said outlet door assembly for effecting powered rotation of said rotating door between positions corresponding to said open and closed positions of said outlet door assembly.

8. The instrument of claim 1, further comprising an aperture wall disposed on one side of said transport path and having an aperture formed therein, said photosensitive device being positioned with respect to said aperture panel such that light enters said photosensitive device through said aperture formed in said aperture panel, and wherein said receptacle vessel isolating device comprises:

a positioner frame disposed adjacent said transport path on a side of said transport path opposite said aperture panel; and

a receptacle positioner rotatably mounted within said positioner frame for pivoting movement between first and second positions corresponding to said first and second positions, respectively, of said receptacle vessel isolating device, said receptacle positioner including a V-block structure defining opposed, spaced-apart wall portions, said V-block structure being constructed and arranged such that when said receptacle positioner is in said second position, said V-block structure engages a receptacle vessel disposed in front of said aperture formed in said aperture panel and said opposed wall

portions of said V-block structure are disposed on opposite sides of the receptacle vessel with outer edges thereof in contact with said aperture panel so that the engaged receptacle vessel is at least partially surrounded by a portion of said aperture panel and a portion of said V-block structure including said opposed wall portions.

9. The instrument of claim 8, said receptacle vessel isolating device further comprising a motor operatively coupled to said receptacle positioner for effecting powered rotation of said receptacle positioner between said first and second positions corresponding to said first and second positions, respectively, of said receptacle vessel isolating device.

10. The instrument of claim 1, further comprising an aperture panel disposed adjacent said transport path and having an aperture formed therein, and wherein said photosensitive device comprises:

a photomultiplier tube adapted to detect light emitted from an object placed before a light-admitting opening at one end of said photomultiplier tube and to generate an electronic signal indicative of light detected by said photomultiplier tube, said photomultiplier tube being positioned on a side of said aperture panel opposite said transport path with said light-admitting opening thereof positioned with respect to said aperture to receive light emitted from the contents of a receptacle vessel disposed on said transport path in front of said aperture; and

a shutter assembly mounted on said aperture panel and constructed and arranged to selectively admit light through said aperture formed in said aperture panel and into said photomultiplier tube by movement of said shutter assembly between an open position allowing light to pass through said aperture and a closed position preventing light from passing through said aperture, said shutter assembly comprising:

a shutter constructed and arranged for rotational movement between open and closed positions corresponding to open and closed positions, respectively, of said shutter assembly, whereby said shutter blocks said aperture when said shutter

is in said closed position and does not block said aperture when said shutter is in said open position; and

a motor operatively coupled to said shutter for effecting powered rotation of said shutter between said open and closed positions.

11. The instrument of claim 10, further comprising one or more sensors constructed and arranged to detect when said shutter assembly is in at least a one of said open and closed positions.

12. The instrument of claim 4, further comprising a bar code scanner positioned outside said housing so as to scan a bar code label associated with a receptacle vessel prior to the receptacle vessel being admitted into said housing.

13. The instrument of claim 1, further comprising a reagent dispensing system constructed and arranged to dispense one or more reagents into each of the receptacle vessels on said transport path.

14. The instrument of claim 1, wherein the plurality of adjacently-arranged receptacle vessels comprise one or more reaction receptacles, each of said reaction receptacles comprising two or more adjacently-arranged receptacle vessels connected to each other.